

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/GB 03/02774	International filing date (<i>day/month/year</i>) 30.06.2003	Priority date (<i>day/month/year</i>) 28.06.2002
International Patent Classification (IPC) or both national classification and IPC G06F15/78		
Applicant CRITICAL BLUE LTD et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

I ☒ Basis of the opinion

II ☐ Priority

III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

IV ☒ Lack of unity of invention

V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

VI ☐ Certain documents cited

VII ☐ Certain defects in the international application

VIII ☐ Certain observations on the international application

Date of submission of the demand 12.01.2004	Date of completion of this report 18.04.2005
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div>	Authorized Officer Sadoune, M-M Telephone No. +49 89 2399-8256



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB 03/02774

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-23 as originally filed

Claims, Numbers

1-25 received on 01.09.2004 with letter of 01.09.2004

Drawings, Sheets

1-10 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 3-11,13-23

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the said claims Nos. 3-11,13-23

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the Standard.

☐ the computer readable form has not been furnished or does not comply with the Standard.

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees, the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest.

☒ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

☐ complied with.

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☒ not complied with for the following reasons:

see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

☐ all parts.

☒ the parts relating to claims Nos. 1,2,12,24,25 .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1,24
Inventive step (IS)	Yes: Claims	
	No: Claims	2,12,25
Industrial applicability (IA)	Yes: Claims	1,2,12,24,25
	No: Claims	

2. Citations and explanations

see separate sheet

1 Documents

The documents D1 to D5 are numbered in the order in which they are listed in the Search Report.

2 Unity (IV)

The reasoning of non-unity of the Invitation to Pay Additional Fees is confirmed.

3 Non-establishment of Opinion (III)

Examination is restricted to the inventions which have been searched, namely invention 1 and claims 1, 2, 12, 24 and 25.

The other inventions should be excised from the claims, description and drawings.

Claim 3-11 and 13-23 which have not been searched are not to be examined in terms of novelty and inventive step.

4 Amendments

The amendments filed with the letter dated 01.09.2004 introduce subject-matter which seems to extend beyond the content of the application as filed contrary to the requirements of Articles 19(2) and 34(2)(b) PCT.

The origin of the features of item (d) of claim 1 could not be identified in the application as filed and the applicant did not answer to the request to indicate the origin of these features in the application as filed.

5 Clarity

The application does not meet the requirements of Article 6 PCT because claim 1 and 2 are not clear.

In claim 1 item (d), it is not clear how the copy capability is used to allow data communication.

In claim 1 item (d), it is not clear how execution units are "directly connected" and to what they are connected.

In claim 1 item (d), it is not clear how execution units "communicate data" and what are the source and the destination of then communication.

Claim 2 introduces a confusion between two usual parts of a microprocessor architecture, execution unit and register file. It seems that execution units and register files should be clearly identified in the microprocessor of claim 1.

6 Novelty and inventive Step (V)

a) The subject-matter of claims 1 and 24 is not new. It is anticipated for instance by D1, D2 and D3.

Execution units and registers to store operands and results as in the introductory portion of claims 1 and 24 and in items (a) and (b) are usual features of a microprocessor.

Moving data between registers as in item (c) is also usual. A usual "move" instruction has the effect of copying data between an operand source register and a result destination register.

Execution units communicating data as in item (d) is also usual. Any usual transfer of data involving an execution unit may be viewed as a data communication as in item (d).

- b) As far as it can be understood the subject-matter of claim 2 does not involve an inventive step.
 - c) Usual operations such as a "register move" or an "add plus zero" are an identity operation as in claim 12. Thus the subject-matter of claim 12 is not considered to involve an inventive step.
 - d) The subject-matter of claim 25 considered as depending on claims 24 and 2 or 12 does not involve an inventive step.
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7 Formal remarks

- a) The independent claims should be cast in the two-part form in accordance with Rule 6.3(b) PCT.
- b) Reference signs in parentheses should be inserted in the claims to increase their intelligibility in accordance with Rule 6.2(b) PCT.
- c) The description should be made consistent with the claims.
- d) The summary of the invention should refer to an apparatus and a method provided by the invention according to claims 1 and 24.
- e) Prior art documents should be acknowledged in the description and the relevant background art disclosed therein should be briefly discussed in accordance with Rule 5.1(a)(ii) PCT.
- f) The statement relating to the "spirit" of the invention at page 23 of the description should be deleted in accordance with Article 6 PCT and Guidelines C-III, 4.3a PCT.

CLAIMS

1. A microprocessor with an architecture incorporating several execution units, whereby:
 - (a) one or more registers store results from particular execution units;
 - (b) execution unit operands receive data from one such register;
 - (c) certain execution units are able to copy data from their operands to result registers; and
 - (d) the copy capability is used to allow execution units that are not directly connected to communicate data.
2. The microprocessor according to claim 1 whereby one or more of the execution units may be register files.
3. The microprocessor according to claim 1 whereby the set of registers associated with a particular execution unit to be written may be specified for each operation.
4. The microprocessor according to claim 3 whereby the specification of registers to write is represented in an instruction format.
5. The microprocessor according to claim 4 whereby the specification of registers to write is delayed in a pipeline so as to be available on the same clock cycle as the results.
6. The microprocessor according to claim 1 whereby the connectivity between execution units is known to code generation software tools.
7. The microprocessor according to claim 1 whereby available execution units are specified in a library file.
8. The microprocessor according to claim 7 whereby the connectivity of execution units to other units in the system is configurable.
9. The microprocessor according to claim 8 whereby the number of output registers associated with an execution unit is configurable.

10. The microprocessor according to claim 1 whereby the update of the result registers is dependent on global condition state for certain execution units.
11. The microprocessor according to claim 10 whereby the state used to control the output register update is selectable as part of the instruction set.
12. The microprocessor according to claim 1 whereby certain identity operations may be issued to an execution unit in order to perform a copy.
13. The microprocessor according to claim 1 whereby the operation of certain bits with an execution word control certain execution units on a cycle by cycle basis.
14. The microprocessor according to claim 13 whereby the number of bits required to control each execution unit varies depending upon the extent of its connectivity.
15. The microprocessor according to claim 13 whereby certain bits within the execution word for each execution unit select different types of operation to be performed.
16. The microprocessor according to claim 1 whereby each result register may be connected to one or more execution unit operands.
17. The microprocessor according to claim 1 whereby a source register for a particular execution unit operand may be specified by the instruction set.
18. The microprocessor according to claim 1 whereby the processor executes a sequence of contiguous execution words.
19. The microprocessor according to claim 18 whereby, when the end the execution word sequence is reached, execution may branch to one of a number of different execution word addresses.
20. The microprocessor according to claim 19 whereby the same execution word sequence may be repeated to resolve a data hazard.
21. The microprocessor according to claim 20 whereby there is a branch control unit for determining the destination of such branches.

22. The microprocessor according to claim 21 whereby the branch control unit may accept branches out of their sequential order.

23. The microprocessor according to claim 22 whereby the branch control unit may disable the operation of certain subsequent operations depending on the sequential position of an accepted branch.

24. A method of operation used in a microprocessor with an architecture incorporating several execution units, whereby:

- (a) one or more registers store results from particular execution units;
- (b) execution unit operands receive data from one such register; and
- (c) certain execution units are able to copy data from their operands to result registers; and
- (d) the copy capability is used to allow execution units that are not directly connected to communicate data.

25. The method of claim 24 as used in a microprocessor as defined in any preceding claim 2 - 23.